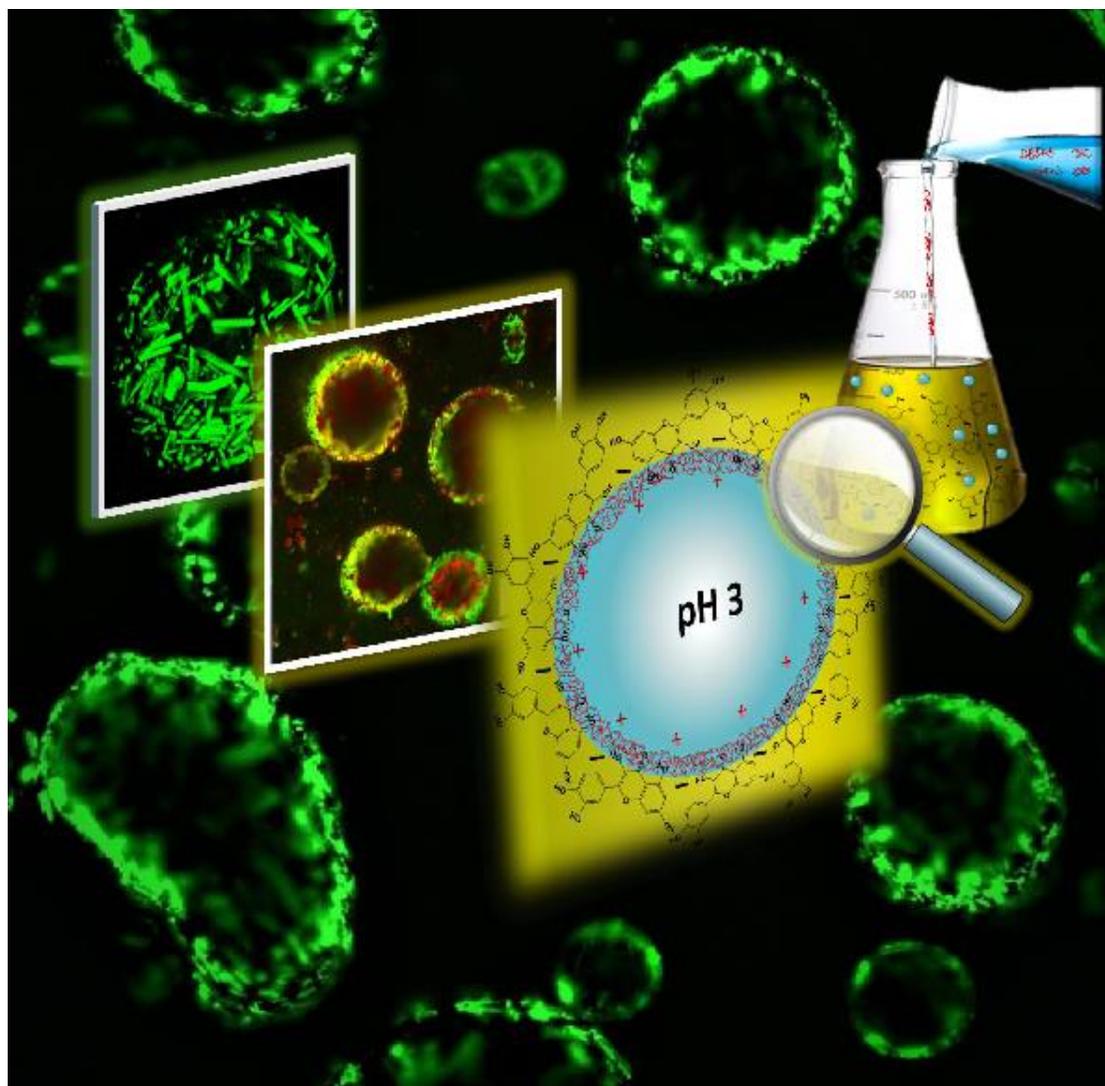


# SOFI CDT NEWSLETTER

EPSRC Centre for Doctoral Training in  
Soft Matter and Functional Interfaces

August 2019



A novel way to stabilize water-in-oil (W/O) emulsions via complex formation at the interface between Pickering polyphenol particles adsorbing from the oil side and proteins co-adsorbing from the aqueous side of the interface, strengthening the mechanical properties of the adsorbed film. (ZEMBYLA, M., MURRAY, B. S., RADFORD, S. J. & SARKAR, A. 2019. *Water-in-oil Pickering emulsions stabilized by an interfacial complex of water-insoluble polyphenol crystals and protein*. *Journal of Colloid and Interface Science*, 548, 88-99.).

## News from the Management Board

### SOFI<sup>2</sup> officially has the go-ahead!

### Cohort 6 to start later this year.



## Note from the new editor

Hi, I'm Kalila from Cohort 5, and I've been entrusted 😊 with the job of putting the next few SOFI newsletters together! I've taken over from Carmen from Cohort 4 who kindly advised me on how to do this – please check out the last page for a few words from her. It has been a busy last few months for SOFI, but I've made sure there's lots of pictures for those of you who, like me, don't like to read. So, enough from me, plenty to get through.... Enjoy!

## SOFI 2019 Soft Matter Showcase

The 4<sup>th</sup> Soft Matter Showcase, organised and hosted by the SOFI CDT, took place at the University of Leeds at the end of June 2019. Over the course of two days, we had the pleasure of seeing some excellent presentations and posters delivered by SOFI CDT students. Additionally, there were a series of keynote talks by invited speakers including Dr Breannán Ó Conchúir (IBM Research), Prof Neil George (Syngenta), Prof Brigitte Voit (Leibniz-Institut für Polymerforschung, Dresden) and Prof Peter Fryer (University of Birmingham). At the end of the first day, attendees enjoyed a conference dinner at the University of Leeds, and on the evening of the second day, we had the annual SOFI ball (see page 5 for more, including photos).

Written by **Carmen Morcillo Pérez**

Continued over page...

## SOFI business school

Earlier this year, Cohorts 3 and 4 returned to Durham for the annual business school, which included lectures on topics including entrepreneurship, finance, intellectual property and corporate strategy. Overall, we had a comprehensive introduction to the world of business.

Through a series of engaging case studies focussed around big industries, such as aviation and chemicals manufacturing, we explored the factors to be taken into account when setting up, growing or maintaining a company, finishing with a presentation from Natasha, Scott and Phil (Cohort 2) of Plastech Innovation, a spin-out company originally conceived during an earlier business school.

We left Durham with a much better understanding of the way in which businesses make decisions, and we look forward to applying this to any future ideas we have.

Written by **Holly Linford**

Photo right: cohort 4 having dinner at Zen in Durham.



## New stage for Cohort 5

The team disbanded to start PhD projects across the universities. Cohort 5 are now a few months into their projects – here's what they are up to (titles subject to change!):

### Durham University:

- **Lloyd Shaw** – *Breathing new life into living anionic polymerisation*
- **Ruth McTiernan** – *Mechanics of biological interfaces*
- **Dominic Donkin** – *Novel phage-encoded disruptors of bacterial cell division*
- **Sam Meacham** – *Monomers for biodegradable plastics – green production by heterogeneous catalysts*
- **Seth Price** – *Theory of evaporating droplets*
- **Burhan Hussein** – *Manipulating interactions across lipid membranes*
- **Beth Beck** – *Biodegradable silicon polymers*
- **James Cochran** – *Chaos and instability in complex matter*
- **Jenny Maunders** – *Improved nanomaterials for heterogeneous catalysis via separation of nucleation and growth processes*

### University of Edinburgh:

- **Kelly Wood** – *Super-resolution microscopy probes for neurodegenerative disorders*
- **Jack Hocking** – *Killing bacteria with viruses*
- **Sam Brown** – *Enhancing interlaminar toughness and electrical conductivity in multifunctional composites: understanding the interface*
- **Marie Rapin** – *Sidechain modifications in algal biopolymers*
- **Veronica McKinny** – *The drying of blood*
- **Lucas Le Nagard** – *Living materials made of bacteria and lipid membranes*

### University of Leeds:

- **Adele Parry** – *Novel liquid crystal droplets for detecting toxins*
- **Charlotte Pugsley** – *Using precision polymerisation techniques to develop novel carriers for enhanced delivery of bioinsecticides*
- **Merin Joseph** – *Quasicrystals in soft matter systems*
- **Kalila Cook** – *Determining rational design principles for biopolymer hydrogels*
- **Jordan Hobbs** – *Liquid crystalline soft photonics materials for multimodal optics*
- **Kate Lefroy** – *Solubilisation, fragmentation and precipitation of colloidal particles of cellulose as stabilising agents in foods*

## SOFI Showcase 2019 – continued

The 2019 Showcase poster winners were Sarah Goodband, Richard Chilvers and Andrew Christy for their respective posters on *'Investigating the ageing of model liquid infused porous surfaces'*, *'Functionalised styrene monomers for the manufacture of metal nanoparticles'* and *'Modelling liquid-liquid phase separation'*. Check out the [SOFI Events webpage](#) to see the other presenters and their topics.



The 2019 Showcase poster prize winners. From left to right: Sarah Goodband, Richard Chilvers, Prof. Brent Murray and Andrew Christy.

## SOFI Staff Profile: Dr Mike Ries

I am a Senior Lecturer in the School of Physics and Astronomy at the University of Leeds. I work closely with industry, with a Royal Society Industry Fellowship (2013-2017) and several industrially funded PhD studentships. I currently work closely with Futamura, a Japanese company involved in processing cellulose. My research focuses on a variety of techniques, especially the use of NMR, to determine microscopic properties of soft matter systems and then link these to their macroscopic properties. I am involved in both theoretical and experimental work and have been involved in many multi-disciplinary collaborations: Medical Research Council Fellowship supervision in collaboration with Leeds Faculty of Biological Sciences; Wellcome/EPSC-fundated postdoctoral supervision in collaboration with Leeds Schools of Engineering and Medical Physics; EPSRC and Leverhulme postdoctoral supervision with Leeds School of Plant Science on nuclear magnetic resonance of polysaccharide blends. I set up, and now manage, the NMR research facility in the Soft Matter Physics research group here at the University of Leeds. I am on the editorial board of Scientific Reports (Nature Publishing), Macromolecules and Macro Letters (ACS journals). I am passionate about communicating science and have given numerous lectures for the Royal Institution in their Faraday lecture theatre. I have always been actively involved in voluntary work - I am the treasurer for the IOP Yorkshire Branch (formerly the Chair and Outreach rep), on the IOP Polymer Physics committee, and I was the winner of a Millennium Award, and two Leeds City Council awards, for my community work.



## SOFI profile: Jack Williamson

I am Jack Williamson (Cohort 4), and I am based in Durham, working in Paul McGonigal's group. I did my MChem in Durham which included a masters project on the synthesis of graphene foams by



incineration of polymerised emulsions. My work is on the synthesis of discotic liquid crystals with aromatic cation centres, using three-membered and seven-membered rings as a molecular centre. Ideally, we aim to make conductive liquid crystals that can also interact with light, as similar materials show dual fluorescence properties. I am also working with another group run by Dr Kohout, who I was able to work with for two weeks in Prague to analyse my liquid crystals.

## SOFI Alumna: Aixa Piñeiro

Hello! My name is Aixa Piñeiro, and I was part of Cohort 1. After my PhD, I was worried about what would come next. I asked myself so many times "what else can I do?". I could not have imagined the number of skills I would develop during the past four years with the help of my supervisor Colin Bain - all of them had great value in my next job. In particular, I improved at identifying and resolving problems and managing tasks from beginning to end. My PhD also gave me the opportunity to learn about how to organise and communicate ideas effectively in oral presentations. During my PhD, I studied the drying of agrochemical droplets on model surfaces, and now I work as an analytical chemist for Domino Printing in Cambridge. My job helps the ink developers understand whether or not the raw materials in the ink formulation migrate through the substrates that will be in contact with food. I would definitely recommend trying to join a PhD programme like SOFI.



## SOFI at the 5th International Soft Matter Conference (ISMC 2019)

The 5<sup>th</sup> International Soft Matter Conference was held in Edinburgh on the 3<sup>rd</sup> – 7<sup>th</sup> June (co-sponsored by SOFI) held under the auspices of the [SoftComp Network of Excellence](#). The conference was well-attended by both SOFI students and academics and featured leading research from across the globe, including several contributions from SOFI students.

Plenary talks included ‘Macromolecular Mechanochemistry’ by Prof. Stephen L Craig (*Duke University*), ‘Tough topological polymers and their applications to energy-efficient vehicles and medicine’ by Prof. Kohzo Ito (*University of Tokyo*), whose talk featured a video of the President of Japan demonstrating the durability of these novel polymers with a mallet, and ‘Biofilms: What’s in it for Soft Matter?’ by SOFI academic, Prof. Cait MacPhee (*University of Edinburgh*), who told the story of biofilm formation and how biofilms can be used to make slow-melting ice cream.

A special plenary talk was given by Prof. Tim White (*University of Colorado, Boulder*), the recipient of the 2019 Soft Matter Lectureship, an award presented to early career researchers who have made significant advances in the field of soft matter science. Prof. White’s talk, ‘Pixelated Polymers: Programming Function into Liquid Crystalline Polymer Networks and Elastomers’, described his recent advances in developing cross-linked polymer networks with liquid crystalline monomers. He explained how stimuli, such as light or heat, allow manipulation of the orientation of liquid crystalline units, resulting in stimuli-induced variation of properties for diverse applications.

Parallel sessions covered the full breadth of soft matter research, from the fundamentals to industrial application of soft matter. These sessions featured many SOFI students, including presentations by Lucas Le Nagard (Cohort 5) on magnetic bacteria, Sarah Goodband (Cohort 4) on novel anti-foaling coatings, Sophie Ayscough (Cohort 3) on the impact of antimicrobial peptides on bacterial membranes and Jack Law (Cohort 2) on the occurrence of phase transitions on curved surfaces, which are abundant in many biological systems.



*Special plenary talk by Prof. Tim White in McEwan Hall.*



*The volunteers – mostly SOFI students – who helped to keep the event running smoothly.*

On the first evening, there was a reception at Teviot House, the oldest (1889) purpose-built student union building in the world. Poster sessions were held in McEwan Hall and featured many SOFI students (keep an eye on the [SOFI Posters page](#) for updates on recent posters!). The conference banquet was held in the National Museum of Scotland with delegates able to enjoy exhibits on Scottish history and the natural world.

A huge congratulations to Prof. Wilson Poon who headed up the international organising committee (including Prof. Colin Bain and Prof. Helen Gleeson) and Dr Simon Titmuss who chaired the local organising committee. A big thank you also to Ines Foidl (Edinburgh SOFI administrator) for keeping everything running smoothly and the many (SOFI) student helpers (donning ‘Here to help’ t-shirts) who assisted the local organising team for a truly successful conference.

*Written by David Crosby*

## The 2019 Soft Ball

This year's Soft Ball was held in Leeds, following the 4<sup>th</sup> Soft Matter Showcase. After a very busy day of presentations, we enjoyed a three-course meal in Lambert's Yard followed with DJ entertainment. The ball is completely student-organised, so a big thanks to this year's organisers, Holly Linford, Adam O'Connell, Zachary Gradwell and Morfo Zembyla. I believe everyone is already looking forward to the next one!



See above and right some pictures of the cohorts (at least those who could make it from each!) from the Soft Ball: Cohort 2 (top left), Cohort 3 (top right), Cohort 4 (middle) and Cohort 5 (right).

## SOFI Industry Partners

Do you have an urgent, short-term science or technology challenge? If so, there is probably a SOFI CDT PhD student with suitable research expertise who can work with you to seek solutions. SOFI students are able to participate in (up to) a 3-month secondment from their studies to work with industry partners on such challenges. If this is something you would like to explore further, please contact SOFI CDT manager, Lian Hutchings ([l.r.hutchings@durham.ac.uk](mailto:l.r.hutchings@durham.ac.uk)), for further information.

## Outreach: "Soft can be the toughest"

In March, the Soft Matter and Biological Physics group from Durham University ran an outreach event as part of the university's 'Saturday Morning Science' series. SOFI academics Dr Kislou Voitchovsky, Dr Margarita Staykova, Dr Halim Kusumaatmaja, and Cohort 3 student, Natasha Rigby, gave a public lecture entitled "Soft can be the toughest!"



Dr Kusumaatmaja presenting.

which included an introduction to soft matter science and an overview of each academic's area of research. After the lecture, Natasha and Alvin Shek (also C3) worked with a team of other PhD students to lead a selection of activities including racing droplets on super-hydrophobic surfaces, optical microscopy of foodstuffs, and Atomic Force Microscopy.

Written by **Natasha Rigby**

## Morfo wins Best Poster prize at the 9th International Colloids Conference

Big Congratulations to Morfo Zembyla (Cohort 2) for winning Best Poster at the 9th International Colloids Conference for her research on Pickering water-in-oil emulsions stabilised by a polyphenol crystal-protein complex. This is an amazing feat as there were 230+ posters. The two papers related to her poster are as follows (see also the front page of the newsletter):

Zembyla M, Murray BS, Radford SJ, Sarkar A. 2019. Water-in-oil Pickering emulsions stabilized by an interfacial complex of water-insoluble polyphenol crystals and protein. *Journal of Colloid and Interface Science*. **548**: 88-99. <http://dx.doi.org/10.1016/j.jcis.2019.04.010>.

Zembyla M, Murray BS, Sarkar A. 2018. Water-in-oil Pickering emulsions stabilized by water-insoluble polyphenol crystals. *Langmuir*. **34** (34):10001-10011. <http://dx.doi.org/10.1021/acs.langmuir.8b01438>.

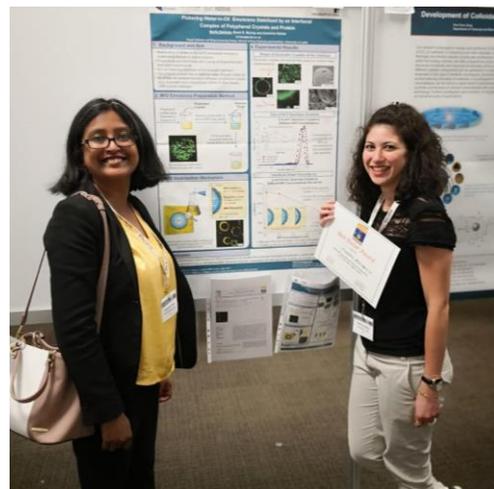
Extracted and edited from '[Sakar Lab](#)' news.

## Thanks to the previous editor!

Thanks very much to Carmen for guiding me on how to put the newsletters together and for providing plenty of material for this issue. Carmen has done a great job editing the newsletters over the last year – I can tell you, it's not easy!

### Carmen Morcillo Pérez

Hi! I'm Carmen, and I graduated in Chemistry at the Complutense University of Madrid. As part of my degree, I spent my fourth year in Durham (with Prof Karl Coleman) working on the functionalisation of single-walled carbon nanotubes to increase dispersibility. Currently, I am based in Edinburgh, in the Physics and Astronomy department, working with Dr Job Thijssen. My PhD project is focussed on the study of colloidal droplets drying on rough surfaces for crop-care applications. Outside of my studies, I like dancing and travelling. I was also the previous newsletter editor, so I hope you enjoyed all those editions!



Morfo Zembyla (right) by her winning poster with Dr Sarkar (left).

Keep up with all the SOFI news online! Find us on



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Feedback and submissions for future issues welcome!  
Please contact Kalila Cook at [py13kc@leeds.ac.uk](mailto:py13kc@leeds.ac.uk)